



PVRC Newsletter

December

Newsletter Editor: John K3TN jpescatore@aol.com

Website: <http://www.pvrc.org>

Meeting Info: <http://www.pvrc.org/chapters.htm>

Facebook: <https://www.facebook.com/groups/PotomacValleyRadioClub/>

President's Letter – Mike N4GU

As I write this, we have just celebrated Thanksgiving (and CQWW CW!) and are heading into the holiday season through the rest of the year. It's a time to look back at the past year and look forward to the coming new year. 2022 has seen us come through the worst of the pandemic (hopefully) and we're able to resume in-person meetings once again. For that we are thankful. Meeting our friends and making new ones face-to-face is a valuable part of organization. Hopefully, in 2023 we can do more of this.

Here comes the sun! This fall the sun has shown its stuff with the new solar cycle ramping up rapidly. Having 10 and 15m available has made for a lot more fun. 2023 promises even better conditions, so we have a couple of more years of good propagation.

One casualty of the pandemic is the Richmond Frost Fest, usually scheduled for early February. There will be no Frost Fest for 2023 as the organizers get their ducks in a row for 2024. We wish them luck and look forward to being back in 2024. Frost Fest has traditionally been when we have the Galactic Luncheon. In its place, we have had a Galactic (Zoom) Event with speakers. Jerome, K8LF, is working on organizing one for 2023. Look for announcements next month.

January will be the start of a new year of North American QSO Parties. PVRC is sponsoring a new club competition event using the online contest scoreboard. The announcement is elsewhere in this newsletter.

73, Mike N4GU

Annual Virtual Galactic Lunch on February 4th – Jerome K8LF



Mark your calendars for the Annual Virtual Galactic Lunch, a PVRC yearly event hosted by Colonial Capitol PVRC Chapter. There will be comments from the PVRC officers and expert presentations.

Feb 4th 2023 at 1 PM via Zoom – don't miss it!

The NOSCC: NAQP Online Scoreboard Club Challenge

The Potomac Valley Radio Club welcomes all contest clubs to compete in the NAQP Online Scoreboard Club Challenge (NOSCC) starting in January 2023. This event encourages not just rivalry between clubs, but also challenges individual club members to increase their BIC (Butt-In-Chair) time as they observe their score in real-time on the online scoreboard relative to their neighbors.

How do you contribute your NAQP scores to your club? You must report your score in real-time to the Contest Online Scoreboard. Sign up for the Contest Online Scoreboard by creating a scoreboard profile and following the instructions for your logger [here](#). Make sure your logger is configured with your full club name (for example, in N1MM+, under Config->Change Your Station Data in the "Club" field).

While each NAQP is going on, compare your score on the Contest Online Scoreboard's "Club" tabulation to those with similar stations in your club and competing clubs. Every time you feel a need to get up, look at how close the guy is right behind you and know that he and others will probably pass you up while you're taking a break.

How are club results computed? The day after each NAQP, the NOSCC coordinator (PVRC for the first year) will check club score totals by viewing the "Club" tab for the recently completed contest. Single-Op, Single-Op Assisted, and M/2 scores all count towards each club's total for the contest which are recorded in a spreadsheet and tracked [here](#).

Total Contest Online Scoreboard points for each club will be summed for all six calendar-year NAQP events: January CW and SSB, February RTTY, July RTTY, and August CW and SSB. In late August, the final NOSCC club totals will be announced by the NOSCC Coordinator.

A plaque will be awarded to the winning club.

PVRC Officers:		Trustees:	
President:	N4GU	Mike Barts	K3MM, N3OC, K2AV, K7SV, W3LPL, N3KN, W2RU, W3LL, N4RA
Vice President:	K3WA	Bill Axelrod	
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Treasurer:	WA3AER	Ted Bauer	W3IKN, W4KFT

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Early Ice – Mike W3IP



No operation starting late afternoon November 15th, due to an early season ice "event" ☹️ Base elevation is about 1750 feet, the ring rotor is 37 feet above ground, atop the Blue Ridge mountains west of DC. It took till 11:00 the next morning for the ice to burn off the last antenna and get the SWR back to normal

RSGB December-Long Transatlantic Centenary Test Event

The RSGB are hosting *The Transatlantic Centenary Tests* on the HF bands to commemorate the centenary of the achievement of Amateur Transatlantic communication, during the Transatlantic Tests that were held between 1921 and 1923.

Transatlantic Centenary Tests – Rules

1. The historic call signs activated by RSGB members and Clubs are:
 - [G5WS](#), [G5AT](#), [G6XX](#), [G6ZZ](#) and [G3DR](#) (England)
 - [GD5WS](#) (Isle of Man)
 - [GI5WS](#) (Northern Ireland)
 - [GJ5WS](#) (Jersey)
 - [GM5WS](#) (Scotland)
 - [GU5WS](#) (Guernsey)
 - [GW5WS](#) (Wales)
2. Activating stations will call "CQ TCT" or alternatively "CQ Transatlantic Centenary" on phone.
3. A QSO with a special callsign will be valid for awards on three different modes:
 - CW
 - Phone
 - Digital (any RTTY, PSK, FT8 or FT4 QSO)

this will apply on each band:

160m, 80m, 40m, 30m, 20m, 17m, 15m, 12m & 10m

The maximum number of qualifying QSOs, for award purposes, with each special call sign will be 26; that is 8 SSB, 9 CW and 9 Digital.

QSOs with a special station will be worth 1 QSO point for each unique band/slot.

4. All QSOs must be made between 00:00 UTC 1 December 2022 and 23:59 UTC 31 December 2022.

5. Worked all UK Special Stations Awards will be available:

- a. Basic – at least one QSO with each of the UK & CD stations
- b. Bronze – 50 QSO points
- c. Silver – 100 QSO points
- d. Gold – 150 QSO points
- e. Platinum – 200 QSO points

6. Special awards

The Top Scorer in the UK and the Top Scorer Internationally will each be awarded a trophy.

OneOdio Pro10 Headset Evaluation -Alan WA3EKL

Question. How good of a headset do we need for efficient communication? Since this evaluation is appearing in the PVRC newsletter a better question would be: how good of a headset do we need for contest communication? In reality, what do we actually need? Let's set up some normal parameters:

- We want comfort so the headphones can stay on our heads for long periods of time.
- We need lightweight headphones for comfort.
- We need headphones that can articulate the human voice range with precise accuracy.
- We need headset microphones that sound very good between 300Hz to 3300Hz.
- We would like headphones with about a seven-foot cord.

Before some CW ops begin thinking ahead of me, even though you narrow your band pass down to maybe 125 Hz the center frequency is still somewhere between 450Hz to 700Hz that you are listening to, so the above frequency parameters still hold true.

I spoke to some of my operators and Ullis K3LU very wisely said "You don't need expensive headphones that cover the entire frequency range of 20 to 20,000Hz. You only need headphones that cover the frequencies you want to listen to." If you do enough research you can find inexpensive headphones that will satisfy the above parameters. I am only talking about the headphones. You will need to attach a mic to the headphones. We will get to the mic after we concentrate on the headphones. By the way I am writing this article in a stupor near the end of SS CW while K3MTR is sitting beside me running stations on 80 meters with the headphones on!

First a little surprising human ear knowledge. If you do a little research, you will find the typical male conversation frequency range is actually between 80Hz to 180Hz and the typical female conversation frequency range is between 156Hz to 265Hz. What we are actually hearing is the harmonics of those base frequencies! Why did I pick the frequency range of 300Hz to 3300Hz ?

The power in the human male voice is down in the 100 Hz to 1000Hz range. This is where the vowels like “a” “e” and “u” are spoken. However, the lower end around 250Hz can get really muddy. This is why we suppress it. The vowels at the upper end around 1000Hz can get too spiky and need to be reduced a little for better clarity. The consonants in our voices all appear between 2000Hz to 4000Hz. The consonants provide the intelligibility and clarity to our speech. The presence in our voices appears at 5000Hz and sibilance comes in between 6000 to 7000Hz.

Sibilance is that sound that adds the extra high-pitched sound at the end of the letter “S”. However, with our modern Amateur Radio transceivers presence and sibilance never enter the picture because our radios start rolling everything off to nothing at about 3400Hz. Our human ears are most sensitive between 300 to 3000Hz which is where we want our headphones to provide maximum performance.

The lower frequency ranges are what is driving up the output power in your amplifier. Present thinking is to roll off or suppress most of the lower frequencies which makes no sense to me because the lower frequencies in our male voices are pumping out the power in our amps or transceivers. The higher frequencies are where most of the intelligence lies and just go along for the ride on top of the lower frequencies. Case in point: During an SSB contest on a crowded band usually we must reduce the width of our DSP bandpass filter’s to reduce side QRM. When you do that, you must also shift the center frequency of the bandpass filter lower in frequency to maintain intelligibility.

Many stations you can still copy even with a very reduced bandwidth because the other stations have not taken out all their lower frequency range. The other stations that you cannot copy and which sound like mush have taken out their low-end frequencies!

I have to include the following for your consideration. As contesters today we are being taught to pinch down our mic’s bandwidth, take out the lows and boost up the mids and highs so we all sound like we have been breathing helium. If fifteen people are all yelling at the same DX station and all have their mics and equalization adjusted as just mentioned who is going to get through? If everybody sounds the same only the loudest signal will get through with one exception; the signal that sounds different, the signal that sounds crystal clear.

I have said many times; don’t adjust your mic equalizers to make your own voice sound great. Adjust your equalizers so that whoever speaks into that mic, his or her voice will be exactly reproduced even with compress, punch and total clarity. Each one of us has a unique voice and that voice will break a pile up if it is crystal clear because it can be distinguished from all the rest!

During CQ WW Phone K3LR had the best audio I have heard in a contest in a long time. Frank W3LPL spends a great deal of time equalizing his mics so that they produce crystal clear audio. My station does not have the power or antenna systems of some of these major contest stations, yet we still break a lot of pile-ups. That can only be attributed to

good sounding, unique sounding audio that sounds different amongst the competition. Now on to the headphones.

After much research I found that “DJ” type headphones seem to fit the parameters we set above. The ”OneOdio Pro10” headsets on Amazon covered the parameters nicely and they were inexpensive...under \$35.00 Most every review was excellent with only a few complaints by the purists. I kept digging and found a frequency test that supported the excellent reviews. The bass is gently rolled off which we do not need anyway. The mid range has been slightly brightened, which we found to be excellent for both SSB and CW reception in a number of contests thus far. The upper highs we don’t worry about because our radios roll them off so we will never hear them! These headphones are comfortable.



They are over the ear headphones, and I have larger than medium size ears and they fit fine. I found I had the Pro 10s on for 5 to 6 hours without taking them off for a break. They greatly reduced the louder voices of some of my more exuberant ops much better than my Yamaha CM500’s. My Heils were causing too much head and ear pain over prolonged use among my ops which is why I went to the CM500’s some time ago. I was looking to purchase more of the CM500’s except they are no longer available retail which led me to the OneOdio Pro 10 headphones. (Note W3LPL found them available [here](#) – Editor)

I equipped my two OneOdio Pro10 headphones with Mod Mics. The spot where I attached the Mod Mic I sanded smooth on the headphone with some fine sandpaper. The sides of the headphones have tiny concentric circles on them. Using a circular motion I was able to create a tiny flat surface for the diameter of Mod Mic stick on Magnet. After equalizing the Mod Mic we received unsolicited good audio reports.

I was lucky to find the Mod Mic at \$43.95 on Amazon the beginning of October and I bought two. Now that someone has shown interest in the mic on that same site the price has risen to \$56.99. Just a hint about Amazon. If you find something for a good price put it in your cart immediately. You can always remove it later if you find something better. Over the past three years I have found if you revisit the same site on the fourth visit the price will usually have gone up. I also have found Amazon will honor the cart price for a day or two.

OneOdio has many headphones and headsets. I reviewed many of them. I believe the Pro10 with a Mod Mic attached will produce the best sound both hearing and transmitting for contesting, net control, rag chewing and overall amateur use.

The Elecraft K3 has an eight-band equalizer. The centers of those bands are at the following frequencies. EQ1=50Hz, EQ2=100Hz, EQ3=200Hz, EQ4=400Hz, EQ5=800Hz, EQ6=1600Hz, EQ7=2400Hz, EQ8=3200Hz. Notice that each consecutive frequency doubles the one before it except EQ7 which sits between 1600Hz and 2400Hz or near the top of the clarity frequency.

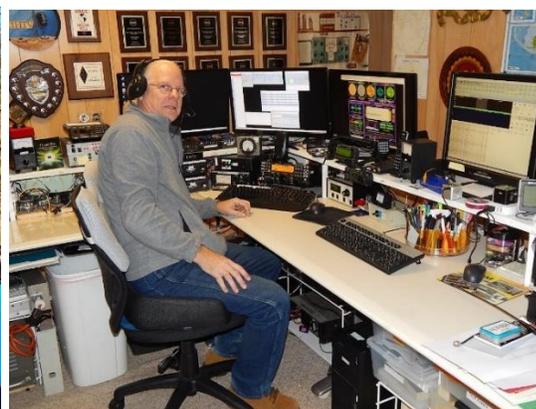
Using my below settings those of you with equalizers can adjust yours to get equal results. Those of you who do not have exact equalizer controls can still achieve excellent TX and RX sound from the Mod Mic and the Pro 10 by using your low, mid and high audio adjustments.

My K3's TX parameters (for Mod Mic)	K3's RX parameters (for OneOdio Head Phones)		
EQ1= -10	EQ5= +6	EQ1= -3	EQ5= +7
EQ2= -10	EQ6= +8	EQ2= -3	EQ6= +10
EQ3= 0	EQ7= +10	EQ3= +1	EQ7= +6
EQ4= +4	EQ8= +15	EQ4= +4	EQ8= +2

K1RA @K1HTV in SSB Sweepstakes– From the PVRC Reflector



Andy K1RA and dad Rich K1HTV



Andy K1RA at the operating position

PVRC DXCC Challenge Standings – Frank W3LPL

Below are the DXCC Challenge totals for PVRC members, transcribed from the ARRL [DXCC data](#) as of the 20th of each month or so. Thanks to Frank for the data each month to make this a regular feature. Please report any omissions or errors to [Frank](#).

CALL	DXCC	CALL	DXCC	CALL	DXCC	CALL	DXCC
W4DR	3199	K3JT	2495	W0YVA	2001	N4ZR	1496
W3UR	3169	N4QQ	2494	K5RJ	1961	W3XY	1494
W3LPL	3158	WS6X	2493	K3SX	1959	N3AIU	1487
K4CIA	3126	K5VIP	2475	N3KS	1906	KM3V	1449
N2QT	3093	W2GG	2436	K4EU	1871	W8AKS	1432
W4PK	3038	W4VIC	2435	N3ND	1867	K3WC	1430
N4MM	2987	W3OA	2426	K3AJ	1818	N3HBX	1428
W3DF	2976	N4GG	2389	W3KB	1815	W3US	1410
WX4G	2960	W2YE	2334	W3DM	1791	N8II	1390
K1HTV	2945	WA2BCK	2316	W3IP	1765	WA3EKL	1388
K5EK	2937	K1ZZI	2314	KE4S	1758	W4PRO	1377
K4SO	2907	N3RC	2314	W2CDO	1755	W9GE	1364
N3NT	2907	W3YY	2297	N4GU	1738	AK3E	1348
W0VTT	2904	K0GD	2289	N4XYZ	1720	NR4M	1326
K2PLF	2903	KA4RRU	2234	W4GP	1710	W3NRJ	1325
KG7H	2895	K3TN	2230	N3OC	1706	ND3F	1319
W3LL	2882	NW4V	2219	KF7NN	1698	N1SZ	1317
K1AR	2872	K4FJ	2214	K4QE	1692	K4ZA	1313
W3KX	2867	N4ZH	2188	NE3H	1668	KG4USN	1292
N4DB	2851	K1EFI	2186	K3WI	1652	K1RH	1226
K3WA	2814	K2BA	2153	W3UL	1637	N3RR	1199
KG4W	2802	W3MR	2150	K3KY	1606	W4NF	1105
AB3CV	2778	N3QE	2147	KE3X	1588	K3IXD	1090
K3RA	2674	N4JQQ	2140	WB4DNL	1586	N1EK	1089
WB3AVN	2663	W3TN	2125	K3STX	1579	NE3K	1073
N3MN	2657	K3PU	2107	NA1DX	1564	N3COB	1049
W4FQT	2622	W3GG	2071	N3MK	1556	W4ZV	1047
K5RT	2577	N4NW	2068	N3AO	1527	W3OU	1046
N3KK	2575	AA4NC	2061	WB2ZAB	1522	K4ZW	1038
W3BW	2550	N3KN	2006	AA4FU	1519	K4VX	1021
K1GG	2509	K4WNW	2004	K4HQB	1518		
N4TL	2504	W3FOX	2002	KU1T	1501		

Membership News – Tim N3QE

Chapter leaders please remember to complete the [Meeting Attendance Report](#).
Members can check and update their roster details via the [Roster Lookup](#).

Upcoming Contests – from [WA7BNM](#)

December 2022	
+ ARRL 160-Meter Contest	2200Z, Dec 2 to 1600Z, Dec 4
+ ARRL 10-Meter Contest	0000Z, Dec 10 to 2400Z, Dec 11
+ RAC Winter Contest	0000Z-2359Z, Dec 17
+ OK DX RTTY Contest	0000Z-2400Z, Dec 17
+ Stew Perry Topband Challenge	1500Z, Dec 17 to 1500Z, Dec 18
+ ARRL Rookie Roundup, CW	1800Z-2359Z, Dec 18

Editor’s Last Word – John K3TN

Thanks to Mike W3IP, Jerome K8LF, Alan WA3EKL, Andy K1RA, and Frank W3LPL for contributions to this issue of the PVRC newsletter.

The quality and usefulness of the PVRC newsletter depends on contributions from members. If you have photos from club meetings, screenshots of new contest software, or brief writeups on station improvements or contest war stories, send them in any format to jpscator@aol.com.



From the PVRC Treasurer – Ted WA3AER

PVRC has chosen not to implement an annual dues requirement. We depend on the generosity of all our club members to finance our annual budget. In addition, active PVRC members are expected to participate and submit logs for at least two PVRC Club Competition contests per year.

When contemplating your donation to PVRC, each member should consider the benefit you are receiving from PVRC and its many opportunities for your personal growth in our wonderful hobby, then donate accordingly.

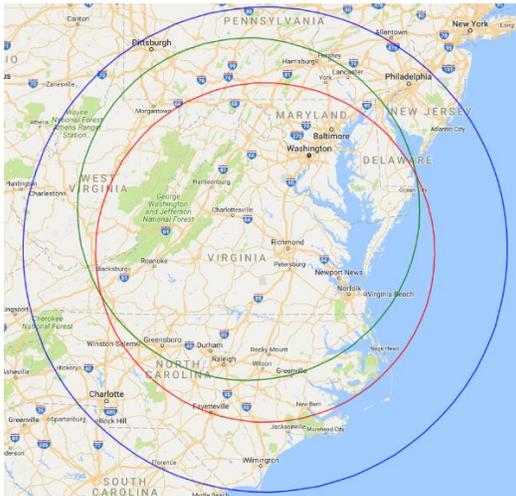
Direct donations to PVRC via Credit Card or PayPal may be made by clicking this "Donate" button and clicking the next Donate button that appears on your screen:



Donations to PVRC are not tax deductible

Eyeball QSO Directions

The latest info on local club meetings and get togethers will always be sent out on the [PVRC reflector](#) and posted on the PVRC [web site](#).



Green: ARRL VHF Circle
175 mile radius
Around 38.075N,
78.171W

Red: ARRL HF Circle
175 mile radius
Around 37.43168N,
77.858482W

Blue: CQ HF Circle
250 mile radius
Around 37.43168N,
77.858482W



Now a Word From Our Sponsors

PVRC doesn't ask for dues, but the Club does have expenses. You can also support the Club by buying from the firms listed who advertise in the newsletter!



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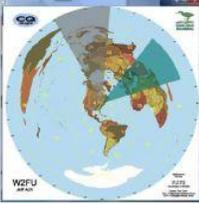
- USB and wireless relay controls
- Utilizes your existing antenna switches



Select-8 Wireless Remote Coax Switch

- Built-in GHE Wireless
- Powered through the coax
- Tower leg Mount
- Amphenol RF connectors






Need Gift Ideas? Call Our Santa's Helper Hotline!

From headsets to transceivers, winter caps to tool kits, you'll find everything for the Hams in your life at one convenient place—DXEngineering.com. Not sure what to buy? Order a DX Engineering Gift Card in denominations from \$25 to \$500. And if you have questions about finding that perfect gift, our Elmers are only a phone call or email away. From all of us at DX Engineering, 73 and Happy Holidays!

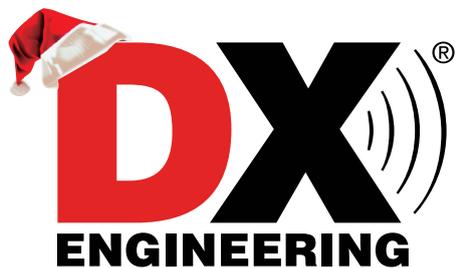
Dear Santa

*I've been a nice operator all year!
Here's a few items to consider...*

Holiday Shopping Made Easy!

Gifts include: Eton portable radio, DX Engineering mug, DX Engineering Gift Card (1-800-777-0703), Eton radio, ECG soldering station, DX Engineering beanie, Yaesu handheld radio, DX Engineering tool kit, ARRL book 'Grounding and Bonding for the Radio Amateur', 'The radiotoday' guide to the ICOM IC-7300, RIGExpert software, HEIL HAM RADIO headset, DX Engineering t-shirt, ICOM IC-7300 transceiver, DX Engineering t-shirt, DX Engineering bag, and DX Engineering foot pedal.

Check DXEngineering.com for the most up to date holiday shipping information!



Ordering (via phone) Country Code: +1

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ELECRAFT K4

High-Performance Direct-Sampling SDR



A direct-sampling SDR you'll love to use

Our new K4 transceiver harnesses advanced signal processing while retaining the best aspects of the K3S and P3. It features a 7" touch display, plus a rich set of dedicated controls. Per-VFO transmit metering makes split mode foolproof. Band-stacking registers and per-receiver settings are versatile and intuitive. Control usage information is just one tap away thanks to a built-in help system.

Modular, hybrid architecture adapts to your needs

The basic K4 covers 160-6 m, with dual receive on the same or different bands. The K4D adds diversity receive, with a full set of band-pass filters for the second receiver. (Thanks to direct RF sampling, there's no need for crystal filters in either the K4 or K4D.) The K4HD adds a dual superhet module for extreme-signal environments. Any K4 model can be upgraded to the next level, and future enhancements—such as a planned internal VHF/UHF module—can be added as needed.

Single or dual panadapter, plus a high-resolution tuning aid

The main panadapter can be set up as single or dual. Separate from the main panadapter is our per-receiver *mini-pan* tuning aid, with a resampled bandwidth as narrow as +/- 1 kHz. You can turn it on by tapping either receiver's S-meter or by tapping on a signal of interest, then easily auto-spot or fine tune to the signal.

Comprehensive I/O, plus full remote control

The K4's rear panel includes all the analog and digital I/O you'll ever need. All K-line accessories are supported, including amps, ATUs, and our K-Pod controller. The USB display output supports its own user-specified format. Via Ethernet, the K4 can be 100% remote controlled from a PC, notebook, tablet, or even another K4, with panadapter data included in all remote displays. Work the world from anywhere—in style!

K4 KEY FEATURES

Optimized for ease of use

Modular, upgradeable design

7" color screen with touch and mouse control

ATU with 10:1+ range, 3 antenna jacks

Up to 5 receive antenna sources

Full remote control via Ethernet



The K4 interfaces seamlessly with the KPA500 and KPA1500 amplifiers

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FTDX10 | HF/50MHz 100 W SDR Transceiver

- Narrow Band and Direct Sampling SDR • Down Conversion, 9MHz IF Roofing Filters Produce Excellent Shape Factor • 5" Full-Color Touch Panel w/3D Spectrum Stream • High Speed Auto Antenna Tuner • Microphone Amplifier w/3-Stage Parametric Equalizer • Remote Operation w/optional LAN Unit (SCU-LAN10)



FT-991A | HF/VHF/UHF All Mode Transceiver

Real-time Spectrum Scope with Automatic Scope Control • Multi-color waterfall display • State of the art 32-bit Digital Signal Processing System • 3kHz Roofing Filter for enhanced performance • 3.5 Inch Full Color TFT USB Capable • Internal Automatic Antenna Tuner • High Accuracy TCXO



FTDX101D | HF + 6M Transceiver

- Narrow Band SDR & Direct Sampling SDR • Crystal Roofing Filters Phenomenal Multi-Signal Receiving Characteristics • Unparalleled - 70dB Maximum Attenuation VC-Tune • 15 Separate (HAM 10 + GEN 5) Powerful Band Pass Filters • New Generation Scope Displays 3-Dimensional Spectrum Stream



FT-710 Aess | HF/50MHz 100W SDR Transceiver

- Unmatched SDR Receiving Performance • Band Pass Filters Dedicated for the Amateur Bands • High Res 4.3-inch TFT Color Touch Display • AESS: Acoustic Enhanced Speaker System with SP-40 For High-Fidelity Audio • Built-in High Speed Auto Antenna Tuner



FT-891 | HF+50 MHz All Mode Mobile Transceiver

Stable 100 Watt Output • 32-Bit IF DSP • Large Dot Matrix LCD Display with Quick Spectrum Scope • USB Port Allows Connection to a PC with a Single Cable • CAT Control, PTT/RTTY Control



FTM-300DR | C4FM/FM 144/430MHz Dual Band

- 50W Output Power • Real Dual Band Operation • Full Color TFT Display • Band Scope • Built-in Bluetooth • WIRES-X Portable Digital Node/Fixed Node with HRI-200



FT-2980R | Heavy-Duty 80W 2M FM Transceiver

- 80 watts of RF power • Large 6 digit backlit LCD display for excellent visibility • 200 memory channels for serious users



FTM-200DR | C4FM/FM 144/430MHz Dual Band

- 1200/9600bps APRS® Data Communications • 2" High-Res Full-Color TFT Display • High-Speed Band Scope • Advanced C4FM Digital Mode • Voice Recording Function for TX/RX



FTM-400XD | 2M/440 Mobile

- Color display-green, blue, orange, purple, gray • GPS/APRS • Packet 1200/9600 bd ready • Spectrum scope • Bluetooth • MicroSD slot • 500 memory per band

FT-70DR C4FM/FM 144/430MHz Xciv

- System Fusion Compatible • Large Front Speaker delivers 700 mW of Loud Audio Output • Automatic Mode Select detects C4FM or Fm Analog and Switches Accordingly • Huge 1,105 Channel Memory Capacity • External DC Jack for DC Supply and Battery Charging



FT-5DR C4FM/FM 144/430 MHz Dual Band

- High-Res Full-Color Touch Screen TFT LCD Display • Easy Hands-Free Operation w/Built-In Bluetooth® Unit • Built-In High Precision GPS Antenna • 1200/9600bps APRS Data Communications • Supports Simultaneous C4FM Digital • Micro SD Card Slot



FT-65R | 144/430 MHz Transceiver

Compact Commercial Grade Rugged Design • Large Front Speaker Delivers 1W of Powerful Clear Audio • 5 Watts of Reliable RF Power Within a compact Body • 3.5-Hour Rapid Charger Included • Large White LED Flashlight, Alarm and Quick Home Channel Access



FTM-6000R | 50W VHF/UHF Mobile Transceiver

- All New User Operating Interface-E20-III (Easy to Operate-III) • Robust Speaker Delivers 3W of Clear, Crisp Receive Audio • Detachable Front Panel Can Be Mounted in Multiple Positions • Supports Optional Bluetooth® Wireless Operation Using the SSM-BT10 or a Commercially Available Bluetooth® Headset



- RETAIL LOCATIONS – Store hours 10:00AM - 5:30PM - Closed Sunday
- PHONE – Toll-free phone hours 9:30AM - 5:30PM
- ONLINE – WWW.HAMRADIO.COM
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